## Lead

From Wikipedia, the free encyclopedia

Lead (IPA: /IEd/) is a chemical element in the periodic table that has the symbol Pb (Latin: plumbum) and atomic number 82. A soft, heavy, toxic and malleable poor metal, lead is bluish white when freshly cut but tarnishes to dull gray when exposed to air. Lead is used in building construction, lead-acid batteries, bullets and shot, and is part of solder, pewter, and fusible alloys. Lead has the highest atomic number of all stable elements - although the next element, bismuth, has a half life so long (longer than the estimated age of the universe) it can be considered stable. Like mercury, another heavy metal, lead is a potent neurotoxin which accumulates in soft tissues and bone over time.

## Contents

- 1 Notable characteristics
- 2 History
- 3 Occurrence
  - 3.1 Lead mining in .
     Wales
  - 3.2 Processing of metal from ore
  - 3.3 Production and Recycling
- 4 Isotopes
- 5 Health effects
  - 5.1
     Biochemistry of lead poisoning
- 6 Descriptive

·		****										
82	thallium $\leftarrow$ lead $\rightarrow$ bismuth											
11 - 11	Pb' 82P 125N 125N Periodic Table - Extended Periodic Table											
General												
Name, Symbol, Number				lead, Pb, 82								
<del></del>	Chemical series				Post-transition metals or poor metals							
Group, Perio	Group, Period, Block				14, 6, p							
Appearance				bluish gray								
Standard ato	Standard atomic weight				207.2(1) g·mol <sup>-1</sup>							
Electron con	figurat	ion	[Xe] $4f^{14} 5d^{10} 6s^2 6p^2$									
Electrons pe												
Electrons per shell 2, 8, 18, 32, 18, 4  Physical properties												
Phase	Phase				solid							
Density (nea	Density (near r.t.)				11.34 g·cm <sup>-3</sup>							
Liquid density at m.p.				10.66 g·cm <sup>-3</sup>								
Melting point				600.61 K (327.46 °C, 621.43 °F)								
Boiling point				2022 K (1749 °C, 3180 °F)								
Heat of fusion				4.77 kJ·mol <sup>-1</sup>								
Heat of vaporization				179.5 kJ·mol <sup>-1</sup>								
Heat capacity				(25 °C) 26.650 J·mol <sup>-1</sup> ·K <sup>-1</sup>								
Vapor pressure												
P(Pa)	··· ) à			100	1 k	10 k	100 k					
at T(K)	978	1088		1229	1412	1660	2027					
,	Atomic properties											
Crystal structure				cubic face centered								
Oxidation states				4, 2 (Amphoteric oxide)								
Electronegativity				2.33 (scale Pauling)								
Ionization energies				1st: 715.6 kJ·mol <sup>-1</sup>								

- chemistry
- 7 Applications7.1 Former applications
- 8 Phrases
- 9 See also
- = 10 Literature
- 11 References
- 12 External links

## Notable characteristics

Lead has a dull luster and is a dense, ductile, very soft, highly malleable, bluishwhite metal that has poor electrical conductivity. This true metal is highly resistant to corrosion. Because of this property, it is used to contain corrosive liquids (e.g. sulfuric acid). Lead can be toughened by adding a small amount of antimony or other metals to it. Lead is the only metal in which there is zero Thomson effect. Lead is also poisonous. All lead, except <sup>204</sup>Pb, is the end product of a complex radioactive decay (see isotopes of lead below).

## History

Lead has been commonly used for thousands of years because it is widespread, easy to extract and easy to work with. It is highly malleable and ductile as well as easy to smelt. In the early Bronze Age lead was used with antimony and arsenic. Lead was mentioned in the Book of Exodus (15:10). Alchemists thought that lead was the oldest metal and associated it with the planet Saturn. Lead pipes that bear the insignia of Roman emperors

(more)			2nd:	1450.5	kJ·mol <sup>-1</sup>						
			3rd:	3081.5	kJ·mol <sup>-1</sup>						
Atomic radius			180	pm							
Atomic radius (calc.)			154	pm							
Covalent radius			147	bar and							
Van der	Waals re	m									
Miscellaneous											
Magnetic ordering			diame	gnetic							
Electrical resistivity			(20 '	°C) 208 n	<u>.</u>						
Thermal conductivity			(300	K) 35.3	W·m <sup>-1</sup> ·K <sup>-1</sup>	,					
Thermal expansion			(25	°C) 28.9	μm·m <sup>-1</sup> ·K <sup>-1</sup>						
Speed of sound (thin rod)				(annealed) m·s <sup>-1</sup>							
Young's modulus			16 (	GPa							
Shear modulus			5.6	GPa							
Bulk mo	Bulk modulus			46 GPa							
Poisson ratio			0.44								
Mohs hardness			1.5								
Brinell hardness			38.3	MPa							
CAS registry number			7439-92-1								
Selected isotopes											
,		Main art	ticle: I	sotopes of	lead						
iso	NA	balf-life		DM	DE (MeV)	DP					
<sup>204</sup> Pb	1.4%	>1.4×10 <sup>17</sup> y		Alpha	2.186	<sup>200</sup> Hg					
<sup>205</sup> Pb	syn	1.53×10 <sup>7</sup> y		Epsilon	0.051	<sup>205</sup> Tl					
<sup>206</sup> Pb	24.1%	Pb is stable with 124 neutrons									
<sup>207</sup> Pb	22.1%	Pb is stable with 125 neutrons									
<sup>208</sup> Pb	52.4%	Pb is sta	ble wi	h 126 neutrons							
210 <sub>Pb</sub>	trace	22.3 y		Alpha	3.792	<sup>206</sup> Hg					
PB				Beta	0.064	<sup>210</sup> Bi					
References											

